



# ***MAPP Climate Prediction Task Force Overview***

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# *The Challenge*

- ISI climate prediction is a foundational capability underlying the provision of climate information, key to NOAA's mission
- One of Climate Program Office/MAPP Program key research areas
- Remains a major challenge with relative slow progress in the last few years



# The Climate Prediction Task Force

- *An Initiative of MAPP Program, established Sep. 2012, 3 year life span*

Goal: achieve significant new advances in current capabilities to understand and predict intra-seasonal to inter-annual (ISI) climate variability

- Provides coordination/focus to MAPP ISI prediction research
- Builds on competitively selected projects to address broader community (cross-cutting) issues
- Leverages/links/contributes to other relevant efforts, nationally/internationally (e.g. USCLIVAR)
- Involves a Climate Test bed component linking research advances to NOAA's operational activities/needs

# *Climate Prediction Task Force Projects*

## **Task Force Projects Include:**

- Projects from three FY12 calls:
  - Advance intra-seasonal to decadal climate prediction
  - Develop an experimental National Multi-Model Ensemble climate prediction system
  - Modeling of Intra-Americas Sea climate processes associated with extremes over North America
- COLA research, co-funded with NSF and NASA
- MAPP-PSD funded research activities

**Involves:** 30 plus PIs, leading experts from NOAA, academia and other scientific institutions.



# CPTF Projects- Seasonal

**Seasonal Prediction:** Developing/evaluating/optimizing multi-model systems; comparing dynamical and statistical prediction systems; exploring predictability

- *A US NMME ISI Prediction System – co-funded with NSF, NASA, DOE (Kirtman et al.)*
- *Developing an Optimum Multimodel ENSO Prediction (Barnston et al.)*
- *Diagnosing CFS2 forecast skill using empirical models of climate prediction and predictability from sub-seasonal to multi-decadal scales (Newmann et al.)*
- *Application of information theory to measure and increase the skill of long-term forecasting (Krakauer)*
- *Best Practices for Estimating Forecast Uncertainty in Seasonal-to-Decadal Predictions (Goddard et al.)*

# ***CPTF Projects - Extremes***

## ***Prediction of Extremes: exploring predictability/ISI outlooks; understanding/modeling processes***

- Toward Developing a Seasonal Outlook for the Occurrence of Major U.S. Tornado Outbreaks (Lee et al.)
- Predictability of Atlantic Hurricane Activity by the NMME.. (Barnston et al.)
- Understanding climate variations in the Intra-Americas Seas and their influence on climate extremes using global high-resolution coupled models (Vecchi et al.)
- Climate Variability of the Tropical Western Atlantic Storms: Is it hinged to Intra-Americas Seas climate processes? (Misra)
- Variability and Predictability of the Atlantic Warm Pool and Its Impacts on Extreme Events in North America (C Wang et al.)
- Modulation of Tropical Cyclone (TC) Activity over the Intra-Americas Sea by Intraseasonal Variability..(Jiang XN et al.)
- Intraseasonal to Interannual Variability in the Intra-Americas Sea in Climate Models(Maloney et al.)
- Towards improving convection parameterization and the MJO in next-generation climate models (Tulich et al.)

# *CPTF Members*

- Tony Barnston
- Chris Ferro
- Lisa Goddard
- Jon Gottschalk
- Xianan Jiang
- Jim Kinter
- Ben Kirtman (Lead)
- Nir Krakauer
- Arun Kumar (Co-lead)
- Sang-Ki Lee
- Malaquias Mendez
- Eric Maloney
- Vasu Misra (Co-lead)
- Rym Msadek
- Matt Newman (Co-lead)
- Kathy Pegion
- Tony Rosati
- Jae Schemm
- Siegfried Schubert
- Mike Tippett
- Joe Tribbia
- Stefan Tulich
- Huug van den Dool
- Gabriel Vecchi
- Duane Waliser
- Chunzai Wang
- Wanqui Wang
- Scott Weaver
- Eric Wood
- Shang-Ping Xie
- Ming Zhao



# Year 1 Activities

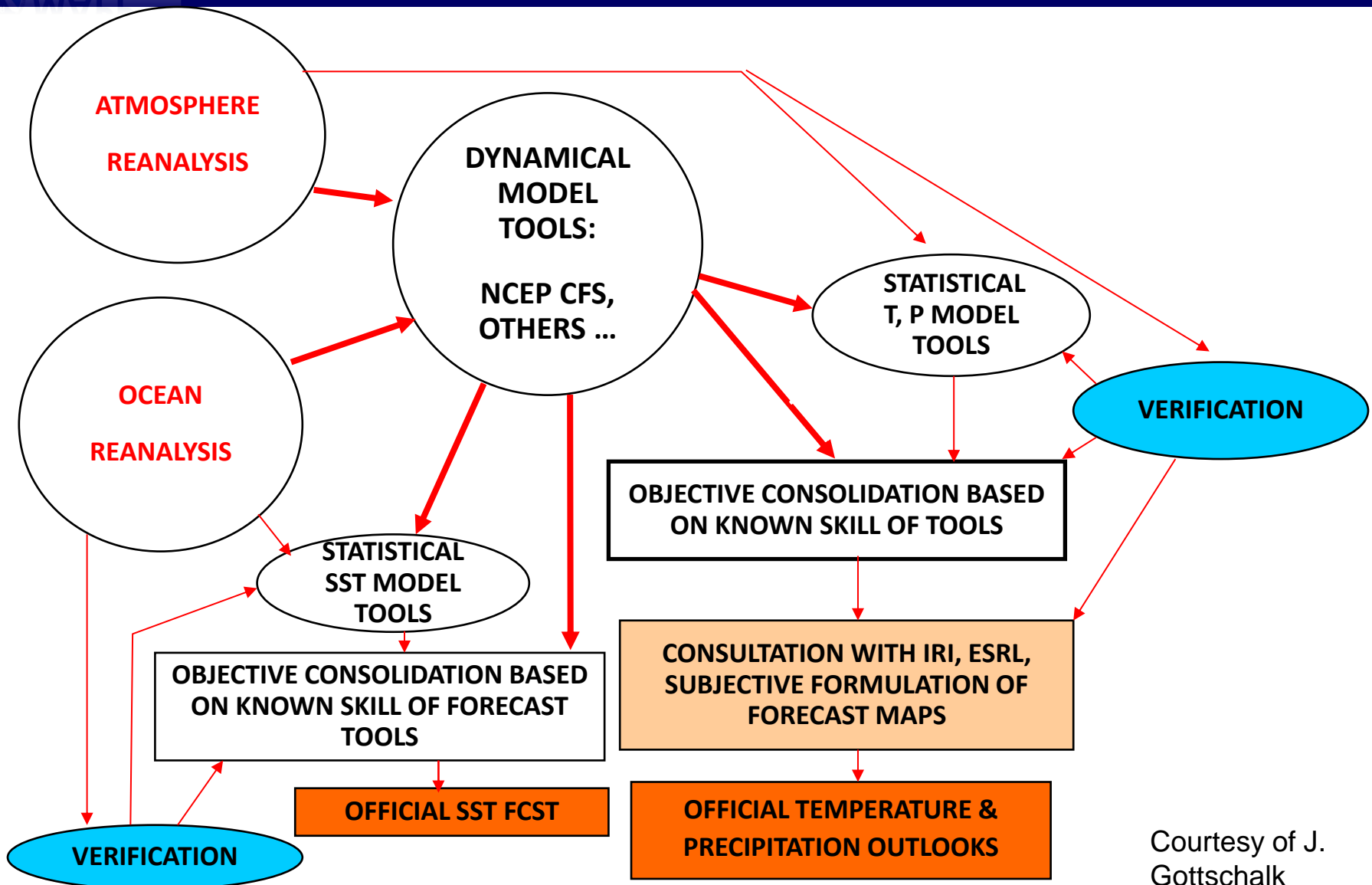
Monthly telecons, with presentations to help the CPTF identify cross-cut objectives/activities

- SPECS EU Project (Doblas-Reyes)
- CPC Forecast Process (Gottschalk)
- Possible Skill Mask (Pegion and Kumar)
- Two Tiered Predictions (Misra)
- Predictability in a Linear Model (Newman)
- Deterministic vs. Probabilistic Predictions (Misra)
- Spread vs. Skill (Barnston and Lyon)
- SST Predictability in NMME (Kirtman)

*A couple of examples..*



# CPC Forecast Process Flowchart

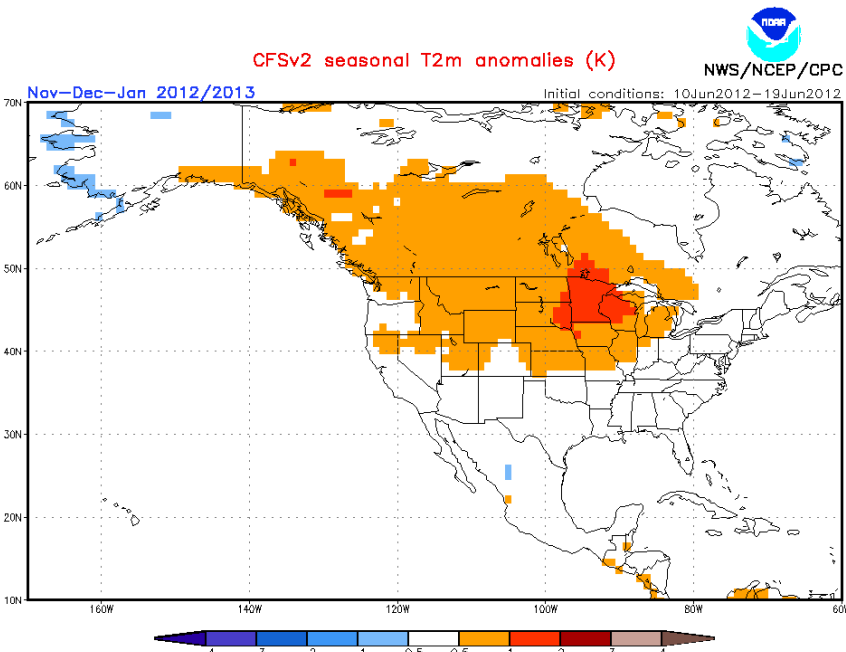


Courtesy of J. Gottschalk

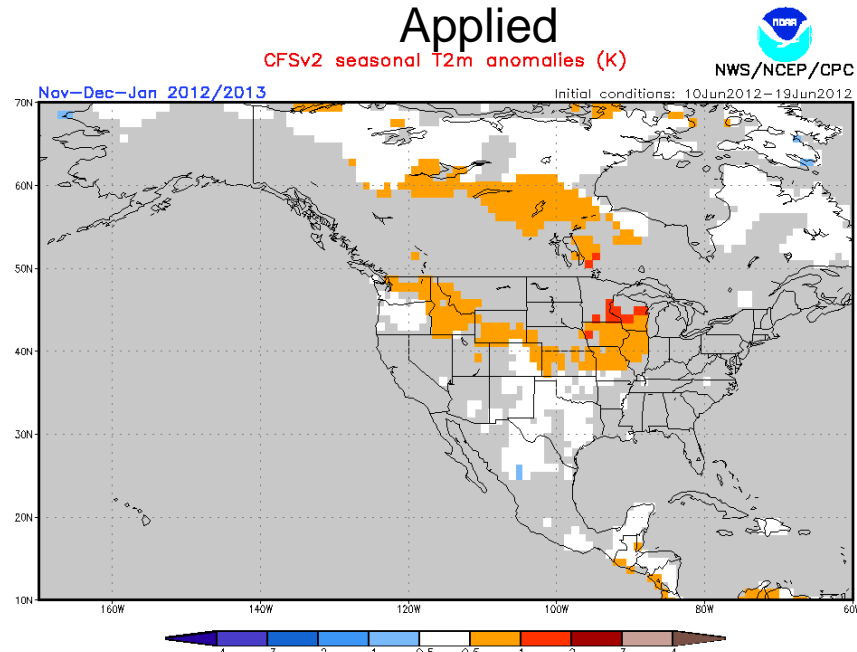
# What is a Skill Mask?

ICs: 20120609 -20120619

CFSv2 T2M Forecast



CFSv2 Forecast w/Skill Mask Applied



From NOAA/NWS/NCEP/CPC (<http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/>)

- Skill Mask is Determined from Re-forecasts
- Average anomaly correlation skill over 1982-2009
- Function of initial month and lead-time
- Average AC skill < 0.3 is considered not skillful

**Skill mask is a simple model to forecast forecast skill**



# *Defining cross-cut objectives*

## Guiding principles

- Need to Feedback to Operational Prediction
- Leverage Funded CPO Prediction and Predictability Research
- Focus on Sub-Seasonal to Interannual Time-Scales (not decadal or climate change)

## Questions/Objectives under considerations

- Linking Predictability Research to Understanding Predictions
- Can We Make a Forecast of the Forecast Skill?
- How to Make a Case-by-Case Skill Mask?
- Developing Forecasts of Opportunity?

# *On-going efforts*

- BAMS Paper on “Linking Predictability Research to Real Prediction”
  - How has predictability theory contributed to prediction?
  - What needs to be done to accelerate/facilitate predictability research in real prediction
  - Specific examples from NMME and Sub-seasonal prediction activities



# *Goals of this CPTF Meeting*

- This is the first in-person meeting for the CPTF – thanks to CDPWS organizers!
- 2 major goals:
  - Provide an overview of projects' activities and achievements – many talks from CPTF PIs today and tomorrow's open sessions
  - Finalize cross-cut objectives and develop a plan for year 2 and 3 – closed session discussion meeting for members & invitees

*For more info Google "NOAA MAPP"*

**THANKS!**

